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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/889,296	01/16/2002	Uwe Rass	P01,0240	1451

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EXAMINER	
WOZNIAK, JAMES S	

ART UNIT	PAPER NUMBER
2626	

DATE MAILED: 04/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/889,296	RASS ET AL.	
	Examiner	Art Unit	
	James S. Wozniak	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 July 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 July 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. **Claims 21-26** are objected to because of the following informalities:

"Frequency domain" in **claim 21**, line 3 should be changed to --time domain-- and "time domain" in lines 3-4 should be changed to --frequency domain--. The examiner points out that, as noted on page 16 of the specification and shown in Fig. 5, it appears as if the described window function in the *time domain* is consistent with the description of the *claimed* window in the *frequency domain* and vice versa. Also, it is further pointed out that the limitation recited in claim 4 seems to be consistent with this description in the specification since it is noted that the time domain window function has a continuous curve.

The term "frequency domain" will be considered to mean "time domain" and vice versa for the application of the prior art of record.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 20 and 27-28** are rejected under 35 U.S.C. 102(e) as being anticipated by Chan (U.S. Patent: 6,032,114).

With respect to **Claim 20**, Chan discloses:

Converting a one-dimensional analog signal into a digital signal *(sampling a speech input, Col. 4, Lines 33-47)*;

Producing a discrete spectral transformation of said digital signal thereby obtaining a frequency domain signal *(Fast Fourier transform (FFT), Col. 4, Lines 64-67)*;

Convolving a frequency response function with a selected discrete window function having a significantly shorter length than said frequency response function, to obtain a convoluted frequency response function *(filter frequency response function, Hn, that is convolved with a window function α_{sp}, which is shorter in length than the overall frequency response function since it only windows a portion of Hn, wherein the convolution is realized by a*

multiplication operation in the frequency domain and results in a smoothed frequency response function H_{smooth}, Col. 9, Line 51- Col. 10, Line 55) and multiplying said frequency domain signal by said convoluted frequency response function to obtain a product *(multiplying a frequency spectrum by H_{smooth} in a spectrum correction unit, Col. 11, Lines 5-12)*;

Subjecting said product to an inverse, discrete spectral transformation, thereby producing a plurality of signal segments *(inverse FFT, Col. 11, Lines 13-15)*; and

Implementing a feature modification of said one-dimensional signal employing an adaptive overlap-add algorithm by overlapping and shifted addition of said plurality of signal segments to produce an output signal having said feature modification *(overlap-add operation, Col. 11, Lines 16-20)*.

With respect to **Claims 27-28**, Chan discloses the FFT and inverse FFT, as applied to Claim 20.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 21-22 and 24-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan in view of Bronez et al *("Alternate Windows of Multi-window Spectral Analysis," 1992)*.

With respect to **Claim 21**, Chan teaches the speech signal modification method utilizing a convolution between frequency response and window functions, as applied to Claim 20. Chan does not specifically suggest the use of a window function having only positive values and a smooth curve in the time domain and a principle lobe and lower amplitude secondary maxima and minima in the frequency domain, however Bronez teaches a discrete prolate spheroidal window having such features *(Figs. 1-2)*.

Chan and Bronez are analogous art because they are from a similar field of endeavor in systems utilizing spectral analysis. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Chan with the window function taught by Bronez in order to minimize interference resulting from energy leakage into a main lobe region *(Bronez, Page 429, Introduction)*.

With respect to **Claim 22**, Bronez discloses:

Generating a window function by converting a window function in the time domain having a continuous curve into said window function in the frequency domain *(transforming a DPSS window into the frequency domain through the use of a Fourier transform, Pages 429-430, Total Sidelobe Energy Criterion)*.

With respect to **Claim 24**, Chan further recites:

The step of converting said one-dimensional analog signal into said digital signal comprises producing a plurality of digital signal blocks *(splitting input speech into a plurality of frames, Col. 4, Lines 33-47)* and wherein the step of subjecting said digital signal to said adaptive overlap-add algorithm comprises individually processing said digital signal blocks with said adaptive overlap-add algorithm *(frame-based overlap-add processing, Col. 11, Lines 17-20)*,

and comprising re-calculating said window function for each individual processing of the respective digital signal blocks *(frame-based window function calculation, Col. 9, Line 51- Col. 10, Line 55)*.

With respect to **Claim 25**, Bronez teaches the process for converting a prolate spheroid window function in the time domain into the frequency domain, as applied to Claim 22.

With respect to **Claim 26**, Bronez further recites:

Subjecting said output signal to an error analysis and thereby obtaining error information, and comprising modifying said window function dependent on said error information *(modifying a window with a weighting function in order to minimize an error related to interference from strong tones near a main lobe region, Page 430, Peak Sidelobe Amplitude Criterion)*.

7. **Claim 23** is rejected under 35 U.S.C. 103(a) as being unpatentable over Chan in view of Bronez et al, and further in view of Depalle et al *(U.S. Patent: 5,401,897)*.

With respect to **Claim 23**, Chan in view of Bronez teaches the speech signal modification method utilizing a convolution between frequency response and DPSS window functions, as applied to Claim 22. Chan in view of Bronez does not specifically suggest storing a window function for use during speech processing, however Depalle teaches such a window function storing means *(Col. 5, Lines 53-57)*.

Chan, Bronez, and Depalle are analogous art because they are from a similar field of endeavor in systems utilizing spectral analysis. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Chan in view of

Bronez with the window function storage means taught by Depalle in order to improve speech processing speed through the use of precomputed windows *(Depalle, Col. 5, Lines 53-57)*.

8. **Claim 29** is rejected under 35 U.S.C. 103(a) as being unpatentable over Chan in view of Davidson *(U.S. Patent: 5,394,473)*.

With respect to **Claim 29**, Chan teaches the speech signal modification method utilizing FFT and inverse FFT transforms, as applied to Claim 20. Chan does not teach the use of a DCT transformation in place of an FFT, however, Davidson teaches the use of a DCT as an alternative to a discrete Fourier transform *(Col. 12, Lines 13-44)*.

Chan and Davidson are analogous art because they are from a similar field of endeavor in systems utilizing spectral analysis. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Chan with the DCT transformation taught by Davidson in order to provide higher coding accuracy for low frequency components *(Davidson, Col. 12, Lines 13-44)*.

9. **Claims 30-32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan in view of Freed *(U.S. Patent: 5,686,683)*.

With respect to **Claims 30-32**, Chan teaches the speech signal modification method utilizing FFT and inverse FFT transforms, as applied to Claim 20. Chan does not teach the use of a Harr, Walsh-Hadamard, or Hartley transformation in place of an FFT transformation, however, Freed teaches the use of such alternative transforms in place of a Fourier transformation *(Col. 6, Lines 9-21)*.

Chan and Freed are analogous art because they are from a similar field of endeavor in systems utilizing spectral analysis. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Chan with the alternative transforms taught by Freed to provide the benefit of being able to implement the speech processing method taught by Chan with multiple types of well known transforms *(Freed, Col. 6, Lines 9-21)*, such as a Hartley transform which allows for faster transform computations *(Freed, Abstract)*.

10. **Claims 33-36** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan in view of Prabhu et al *("Fast Hartley transform implementation on DSP chips," 1996)*.

With respect to **Claim 33**, Chan teaches the speech signal modification system utilizing a convolution between frequency response and window functions, as applied to Claim 20. Chan does not explicitly teach method implementation as a program stored within a digital signal processor having shift registers, however Prabhu teaches spectrum transformation processing implemented as a program in such a DSP having shift registers that are used for storing processing-related data *(such as the frequency response and window functions taught by Chan) (Pages 233-234, Section 1 and Pages 238-240, Sections 6-7)*.

Chan and Prabhu are analogous art because they are from a similar field of endeavor in systems utilizing spectral analysis. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Chan with the DSP taught by Prabhu in order to provide a practical means for method implementation utilizing readily

available DSP chips that allow for faster computational speed *(Prabhu, Page 236, Section 4 and Pages 239-240, Section 7).*

With respect to **Claims 34-35**, Chan teaches the speech signal modification method utilizing a convolution between frequency response and window functions, as applied to Claim 20. Chan does not explicitly teach method implementation as a program stored within a digital signal processor, however Prabhu teaches spectrum transformation processing implemented as a program in such a DSP *(Pages 233-234, Section 1 and Pages 238-240, Sections 6-7).*

Chan and Prabhu are analogous art because they are from a similar field of endeavor in systems utilizing spectral analysis. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Chan with the DSP taught by Prabhu in order to provide a practical means for method implementation utilizing readily available DSP chips that allow for faster computational speed *(Prabhu, Page 236, Section 4 and Pages 239-240, Section 7).*

With respect to **Claim 36**, Prabhu teaches programmable DSPs used for spectral processing, which would inherently require the use of a compiler to program the DSP to implement the specific spectral processing program *(Page 236, Section 4).*

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Benedetto et al *(U.S. Patent: 5,388,182)*- teaches an audio encoding apparatus that convolves a filter transfer function frequency response with a window function.

Vogten et al *(U.S. Patent: 5,479,564)*- teaches a method for audio signal modification utilizing a convolution between a Fourier transform of a window function and a spectral envelope.

Jenkins et al *(U.S. Patent: 5,927,988)*- teaches an analysis filter in which a Kaiser window is multiplied by an ideal impulse response.

Lindemann et al *(U.S. Patent: 6,097,824)*- teaches a dynamic range compression method that convolves a frequency response of a time domain function with an impulse response of a LPF and method implementation in a DSP.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632. The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached at (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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3/31/2006

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